

REPLACEMENT CLAIMS

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1 26. A method for operating a MEMS device having a flap that
2 is movable with respect to a base, the method comprising:
3 applying a pre-bias force to the flap to move the flap at
4 least partially out of contact with an underlying base.

5 27. The method of claim 26, wherein the force produces a
6 biasing torque on the flap to reduce stiction and improve
7 reliability.

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9 28. The method of claim 26, wherein the force produces a
10 biasing torque on the flap to increase switch
11 reliability.

12 29. The method of claim 26 wherein the force is applied by a
13 biasing element chosen from the group consisting of a
14 fixed magnet, current carrying coils, flap torsion
15 springs, magnetic materials, gap-closing electrodes,
16 spring loaded elements, stress bearing materials,
17 piezoelectric elements and thermal bimorph actuators.

1 30. The method of claim 26 wherein the force produces a
2 biasing torque on the flap.

1 31. The method of claim 30 wherein the biasing torque tends
2 to counteract another torque exerted on the flap.

1 32. A microelectromechanical apparatus comprising:
2 a base;
3 a flap having a portion coupled to the base so that the
4 flap is movable out of the plane of the base from a first
5 angular orientation to a second angular orientation;
6 wherein the base has an opening that receives the flap
7 when the flap is in the second angular orientation, the
8 opening having one or more sidewalls, wherein at least
9 one of the sidewalls contacts a portion of the flap such
10 that the flap assumes an orientation substantially

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11 parallel to that of the sidewall when the flap is in the
12 second angular orientation;
13 a sidewall electrode disposed in one or more of the
14 sidewalls and
15 means for applying a pre-bias force to the flap to move
16 the flap at least partially out of contact with an
17 underlying base.

1 33. The apparatus of claim 32 wherein the means for applying
2 a force applies a fixed force to the flap.

1 34. The apparatus of claim 32 wherein the means for applying
2 a force is a biasing element chosen from the group
3 consisting of flap torsion springs, magnetic materials,
4 current carrying coils, gap-closing electrodes, spring
5 loaded elements, stress bearing materials, piezoelectric
6 elements and thermal bimorph actuators.

1 35. The apparatus of claim 32 wherein the means for applying
2 a force produces a biasing torque on the flap.

1 36. The apparatus of claim 35 wherein the biasing torque
2 tends to counteract another torque exerted on the flap.

1 37. The apparatus of claims 32 where the base is made from a
2 substrate portion of an SOI (silicon-on-insulator) wafer
3 and the flap is defined from a device layer portion of
4 the SOI wafer.

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